New chromosome counts for some Western Australian Gnaphalieae (Compositae)

B. J. Lepschi†*
Western Australian Herbarium
Department of Conservation and Land Management
Locked Bag 104
Bentley Delivery Centre, Western Australia 6983, Australia

and

G. J. Keighery
Western Australian Wildlife Research Centre
Department of Conservation and Land Management
PO Box 51, Wanneroo, Western Australia 6065, Australia

Abstract

Chromosome numbers for *Ozothamnus ramosus* ($n = 14$), *Pithocarpa corymbulosa, P. pulchella* (both $n = 13$), and *Rhodanthe psammophila* ($n = 5$), are reported and briefly discussed.

Introduction

The Gnaphalieae is among the largest tribes of the Compositae, comprising over 180 genera and 2000 species distributed throughout the world (Bremer 1994). However, unlike some other tribes of the Compositae (e.g. Heliantheae), there have been few cytological studies dealing with members of the Gnaphalieae (Turner 1977, Anderberg 1991).

As part of a study of the systematics of the genus *Pithocarpa* Lindl. by the first author (Lepschi 1997), chromosome numbers of all three taxa in that genus (see Table 1) as well as in *Ozothamnus ramosus* (DC.) Paul G. Wilson and *Rhodanthe psammophila* Paul G. Wilson were determined. This paper presents chromosome counts for these taxa, none of which appear to have been previously recorded, apart

†) Present address: Australian National Herbarium, Centre for Plant Biodiversity Research, GBP Box 1600, Canberra, ACT, 2601 Australia
*) Author for correspondence.

from *R. psammophila* (see under *Helipterum condensatum* F. MUELL., in TURNER 1970). It should be noted that *O. ramosus* does not belong to *Ozothamnus* sens. str., and will be transferred to a new genus along with a handful of other Australian species currently placed in *Ozothamnus* (C. F. PUTTOCK pers. comm.).

Materials and Methods

Young, freshly collected buds were placed in a solution of 4 parts chloroform, 3 parts 95% alcohol and 1 part acetic acid. These were subsequently transferred to an acetocarmine stain, with meiotic material then examined after "squashing" pollen mother cells. Counts were made using a binocular compound microscope with an oil immersion achromatic lens giving a magnification of approximately ×1000, with up to five counts made per collection. All bud material was collected from wild plants in the field, except for *R. psammophila,* for which material was collected from plants in cultivation. Vouchers for all counts are deposited at PERTH.

Results and Discussion

Results obtained from this study are presented in Table 1. Taxa are arranged alphabetically.

Table 1. Chromosome numbers in some Western Australian Gnaphalieae.

Taxon	Chromosome number (n)	Voucher
Ozothamnus ramosus (DC.) PAUL G. WILSON	14	LEPSCHI & LALLY 3307
Pithocarpa corymbulosa LINDL.	13	LEPSCHI 3858
P. pulchella LINDL. var. *pulchella*	13 13	LEPSCHI & LALLY 2552 LEPSCHI & LALLY 2561
P. pulchella var. *melanostigma* (P. LEWIS & SUMMERH.) LEPSCHI ined.	13	LEPSCHI & LALLY 3401
Rhodanthe psammophila PAUL G. WILSON	5	LEPSCHI 3099

The paucity of cytological studies on the Gnaphalieae unfortunately limits what inferences can be drawn from the data presented here. However, some general observations can be made. Solbrig et al. (1964) and Solbrig (1977) note that in the Compositae, perennial species generally have higher chromosome numbers (i.e. greater than $n = 9$) while annual species, particularly those from arid areas, tend to have lower chromosome numbers. Our data agrees with that of Solbrig et al. (1964) and Solbrig (1977), with *O. ramosus* ($n = 14$) and *Pithocarpa* spp. ($n = 13$) being perennial species from the relatively mesic south-west of Western Australia, and with *R. psammophila* ($n = 5$) being an annual species restricted to the Carnarvon district in eremean Western Australia.

Breeding systems and chromosome numbers may also show some correlation, with higher chromosome numbers (i.e. greater than $n = 9$), often found in outbreeding taxa in the Compositae (Solbrig 1977). Studies by the first author (Lepschi 1997), suggest that all *Pithocarpa* spp. are outbreeders, and the corresponding chromosome number of $n = 13$ for all taxa in the genus is consistent with this. The breeding systems of the other taxa included in this study have yet to be determined.

Direct comparison of chromosome counts obtained for taxa in this study with those of related species is unfortunately not possible for most taxa. The only published chromosome counts for species of *Ozothamnus* are those reported in Hair & Beuzenberg (1968) for seven New Zealand species (as *Helichrysum* spp.), all of which are $n = 14$. However, as mentioned above, *O. ramosus* does not belong in *Ozothamnus* sens. str., and comparison of chromosome numbers in this taxon and the New Zealand species would not be particularly meaningful at this stage, except for relationships at the generic level. Further taxonomic and cytological studies on *Ozothamnus* are urgently required.

The count of $n = 5$ obtained for *R. psammophila* confirms that reported by Turner (1970; as *Helipterum condensatum*). *Rhodanthe* Lindl., as presently circumscribed, is a heterogeneous assemblage (Anderberg 1991, P. G. Wilson pers. comm.) the members of which exhibit great variation in chromosome numbers. As with *Ozothamnus,* further systematic and cytological studies are needed to clarify the significance of this variation. The relationships of *Pithocarpa* are not clear, but the results of a recent phylogenetic study of *Pithocarpa* (Lepschi 1997), suggest that its closest affinities may be with taxa of the *'Lawrencella* complex' of genera (sensu Anderberg 1991). However, Lepschi (1997) studied only a selection of the potential relatives of *Pithocarpa* (including *Argentipallium niveum* (Steetz) Paul G. Wilson and *O. ramosus* of the *Lawrencella* complex), and a more comprehensive sampling of taxa would be required to accurately determine the sister taxon to *Pithocarpa.*

Data on chromosome numbers in genera of the *Lawrencella* complex is poor, but chromosome numbers of $n = 8$, 11 and c. 24 have been reported (Turner 1970). Anderberg (1991) also records $n = 14$, but this appears to be in error. *Argentipallium niveum,* which appears as the sister taxon to *Pithocarpa* in the analysis of Lepschi (1997) has a chromosome number of $n =$ c. 24 (Turner 1970; as *Helipterum obtusifolium* Sond.).

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